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CONTROLLING COUCH GRASS IN THE PRAIRIE PROVINCES

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CONTROLLING COUCH GRASS IN THE PRAIRIE PROVINCES

by F. J. GREANEY*

COUCH GRASS *(Agropyron repens)* is widely distributed throughout the Prairie Provinces. It is a very persistent perennial grass weed which seriously competes with, and reduces the yield of small grain and other crops.

Although couch grass prefers rich soil and abundant moisture it can persist on poor soils. Couch grass seriously competes with crops for nutrients and moisture. In addition it produces toxic substances which may depress the growth of certain crop plants. Couch grass can be a particularly difficult problem in the production of grass seed. Grass seed that contains even a very low percentage of couch grass seeds is heavily discounted.

What makes couch grass such a troublesome pest? Well, first of all, couch grass possesses a very extensive, tough, creeping root system. The rootstocks (underground stems or rhizomes) which are produced near the surface of the ground have numerous joints. Each joint has one or more buds and each of these buds is capable of forming a new plant. Secondly, couch grass has no weak phases in its growth cycle. Thirdly, it is easily spread by seed and rootstocks. These are the characters that make couch grass exceedingly difficult to control. To eradicate couch grass, whether by tillage or chemical methods, it is necessary to kill all the rootstocks.

Identification

The main features of couch grass that distinguish it from other grasses are: (1) The spike, which resembles a slender head of wheat, has spikelets which are flattened broadside against the flowering stem. (2) The leaf, which is about one-quarter inch wide, has a constriction which resembles an M or W about three-quarters of the way up the blade. (3) The base of the leaf tends to be hairy and has claw-like hooks called auricles which clasp the stem. (4) The rootstocks are white when young and have enormous vegetative buds and sharp tips. Later they become about one-eighth inch in diameter and are straw colored. The rootstocks are smooth and hollow except at the joints where they are solid and covered with leaf-like scales.

There are only two grasses in the Prairie Provinces that are likely to be confused with couch grass. One of these is Western Wheat Grass *(Agropyron smithii)*. This grass has a more grayish-blue color than couch grass and its leaves become rigid and tend to roll in at the edges when moisture runs short. In contrast, the leaves of couch grass are lax and although they may wilt under dry conditions they do not roll. The spikelets of couch grass are 3- to 7-flowered whereas those of Western Wheat Grass are 6- to 12-flowered. Both grasses have creeping rootstocks.

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The other grass that could be confused with couch grass is Slender Wheat Grass or Western Rye Grass *(Agropyron tenerum)*. It can, however, be readily distinguished from couch grass by virtue of its more slender, less compact spike and the absence of rootstocks.

Control Methods

In spite of the recent advances in the use of chemicals for the control of weeds, intensive tillage still offers the only feasible means of controlling large field-scale infestations of couch grass. It is possible, however, to obtain satisfactory control of small patches of couch grass with chemicals, or by using combined tillage-chemical methods.

TILLAGE METHODS

For many years the main principle involved in controlling couch grass by tillage was to bring the couch grass roots to the surface where exposure to the sun would kill them. This older method, which is commonly referred to as the "dragging out" or "drying out" method, has lost favor in recent years owing to the fact that it is a laborious and difficult task to bring three or more tons of couch grass roots to the surface of the soil to dry out. Furthermore, controlling couch grass by the "dragging" or "drying out" method often results in pulverizing soil to the extent that it becomes susceptible to wind and water erosion.

The newer or more modern way of controlling couch grass by tillage is known as the "starvation by growth" method. This method is based on the principle of starving the weed. In this case the couch grass rootstocks are encouraged to produce growth but are prevented from producing young plants with any amount of leafy green material. As is well known, large quantities of food in the form of starch and sugar are stored in the roots and rootstocks of couch grass. When the leaves, the food manufacturing part of the plant, are cut off, the plant, in order to grow and reproduce itself, has to draw food directly from the root. Repeated cultivations cut off the leaves of the new plants before they can manufacture food. When this happens the food supplies in the roots become exhausted, the roots decay, and the plant dies. Experimental work has shown that couch grass plants can be killed by removing the leafy portion of the plants every 2 weeks for a period of 9 to 10 weeks.

TILLAGE PROGRAM

For the effective control of couch grass it is recommended that the first tillage operation should be carried out in the fall. Thorough tillage by plowing or one-way disking should be done just before freeze-up. This will expose the rootstocks to freezing and drying during the winter. The next spring, as soon as the couch grass plants have about 2 inches of top growth, tillage should be resumed and then repeated as soon as the regrowth reaches a height of 2 inches. The main aim of using the one-way disk is to shred the rootstocks thoroughly. This will stimulate the growth of the dormant buds and induce starvation by growth. To do effective work, however, the disks must be sharp and the machine properly adjusted. In the first 3 to 5 spring cultivations the one-way disk should overlap half the previous cut. This will insure proper shredding of the tough couch grass roots, steady the disk implement, and promote a better cut. If the sod is exceedingly tough it may be necessary to weight the one-way disk.

The "starvation by growth" tillage method is exacting as well as difficult. Timing of the tillage operation is very important. Couch grass infested fields

should be cultivated with the one-way disk every 2 weeks through the early part of the tillage season. Later in the season the period between diskings may be extended depending on the rate of growth. It is important that all tillage operations be effective. One season of timely, careful cultivation will usually "clean up" a badly infested field. Wet seasons can, of course, disrupt the tillage program and make it impossible to satisfactorily control couch grass. On the other hand, some moisture during the tillage season is a distinct advantage otherwise the couch grass rootstocks may become semi-dormant and when this happens it becomes very difficult to starve out the plant. Under dry soil conditions the rootstocks of couch grass assume dormancy. In this case a cultivator, equipped with chisel points, followed by a cable or rod weeder, oscillating harrows, or similar implement should be used to bring as many of the rootstocks as possible to the surface to dry out. In using such implements, however, every care must be taken to prevent dragging couch grass roots or pieces of rootstocks from place to place. This is particularly important where only scattered patches of couch grass are present in the field.

Excessive pulverization of the soil by repeated cultivations with the one-way disk or other implement should be avoided, if at all possible. It has been found that in sandy or light loamy soils, heavy pasturing before starting tillage will facilitate eradication of couch grass. Furthermore, with sandy or light loamy soils it has been found that dividing an infested field into strips and treating half the strips the first year and the alternate strips the next year, helps to reduce the hazard of soil erosion.

Follow-up treatments are usually necessary in any couch grass eradication program. This helps to prevent re-infestation by seed, seedling plants and viable rootstock pieces. Seeding the land to fall rye is not only helpful in completing the couch grass control program but also reduces the hazard of soil erosion. Where the control program on fields heavily infested with couch grass is not started until late June, a crop of hay may be harvested before commencing the tillage program. However, where couch grass is cut for hay it is most important that this be done before the plants reach the flowering stage. No effort should be spared to keep couch grass plants from producing seed.

CHEMICAL CONTROL

Chemicals are too costly for the eradication of large field infestations of couch grass. However, certain chemicals are now available which can give effective and economical control of patches of this weed.

Large Patches

Sodium TCA is being used to control large patches of couch grass in fields. This chemical should be applied in the spring or early summer at the rate of 70 to 100 pounds of active ingredient per acre and with at least 80 gallons of water per acre. Application must be uniform. Two or three weeks after the chemical has been applied the land should be thoroughly tilled by plow or one-way disk. Cultivations should then be continued at monthly intervals until freeze-up. Where the soil is first cultivated and the roots brought to the surface, the application of 15 to 20 pounds of TCA in the spring followed by the tillage operations described above has given good results.

The chemical TCA is most effective where climatic conditions are warm and humid. In sub-humid regions the residual effect of TCA may extend into the second or third year following application. According to Dr. A. C. Carder,

Research Station, Beaverlodge, Alberta, complete to almost complete kills of couch grass can be obtained with 40 pounds per acre of TCA by following these steps:

(1) One-way disk infested patches in the fall.
(2) Till with the one-way disk the following spring when the plants show 2 to 3 inches of growth.
(3) Follow this disking with an application of TCA applied at the rate of 40 pounds per acre.
(4) One-way disk about 2 weeks after the TCA has been applied.
(5) Till again in late summer and finally just before freeze-up.

TCA is a short-term soil sterilant. Treated areas should, therefore, be fallowed to permit the chemical to break down in the soil. For at least 2 years following the application of TCA, careful check should be made for plants growing from seed or from root sections of couch grass. Follow-up tillage or chemical treatments are usually necessary to eradicate couch grass.

Dalapon is another chemical that is quite effective in controlling couch grass when its application is combined with tillage. Dalapon has less residual effect in the soil than TCA. Two applications of this chemical, each of 8 pounds per acre in not less than 20 gallons of water, are recommended for best results. The first application should be applied in the spring when the couch grass is 6 to 8 inches high. Three weeks later the treated area should be thoroughly tilled with the one-way disk. When the regrowth of couch grass is about 4 inches high the second 8-pound application of Dalapon should be made. The treated area should be tilled 3 weeks later. A third tillage late in the fall is also recommended. Since Dalapon at the above rates does not completely eradicate couch grass, follow-up treatments are necessary. When Dalapon is used for controlling couch grass in the prairie and parkland regions it is best to rejuvenate the couch grass by tillage in the spring and then to apply the chemical when the grass is 6 to 8 inches high.

Small Patches

Sodium chlorate and Atlacide (which is a commercial preparation of sodium chlorate) are long-term soil sterilants. They are useful, however, for controlling small patches of couch grass and for controlling this weed in areas where cultivation is not practical. Two to 3 pounds of sodium chlorate or 2½ to 3½ pounds of Atlacide per 100 square feet are recommended for best results.

Other soil sterilants that can be used for the control of couch grass are Atrazine, Bromacil and Monuron. These chemicals act very slowly and the residual effect lasts 2 or more years. Certain selective herbicides such as Dalapon and Amitrol T. have been found to give effective control of couch grass in corn, soybeans, and other row crops when used in combination with good tillage practices, but they are too expensive for controlling large-scale field infestations of couch grass.

Control in Shelterbelts and Hedges

Good couch grass control can be obtained in shelterbelts and hedges by the use of chemicals such as Dalapon and Simazine, provided care is taken to prevent direct contact of the chemical with the bark and leaves of trees and

shrubs. In applying these chemicals it is most important that label directions be followed carefully.

One of the safest herbicides for the control of couch grass in shelterbelts and hedges is Paraquat. Good control of couch grass has been obtained by applying Paraquat at the rate of 2 pounds per acre or one-fifth ounce per square rod. As the effect of this chemical is temporary it is necessary to repeat the treatment two or three times a year. Paraquat and other herbicides used on couch grass in shelterbelts and hedges should be applied in at least 80 gallons of water per acre or one-half gallon per square rod.

Competitive Crops

Fall rye is a good crop with which to fight couch grass. It competes strongly with this weed. Furthermore, it is helpful in completing the couch grass control program. Fall rye also has another advantage. Where a large field is being cultivated for couch grass control, seeding the land to fall rye will greatly reduce the hazard of soil erosion.

The search for more effective cultural practices and chemicals for the control of couch grass goes on year after year. Obviously, therefore, the information presented in this circular is by no means the last word on controlling couch grass—one of the more persistent and troublesome weeds plaguing farmers in the Prairie Provinces. Farmers should therefore keep in touch with the weed control research and field test work of their provincial Department of Agriculture, University, and nearest federal Experimental Farm or Research Station. Agricultural Representatives should be consulted for the most effective methods of controlling couch grass in any particular area.

FOLLOW LABEL INSTRUCTIONS CAREFULLY WHEN USING AGRICULTURAL CHEMICALS

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